

**Louisiana Department of Environmental Quality (LDEQ)  
Office of Environmental Services**

**STATEMENT OF BASIS**

**Rubicon, LLC  
Geismar Plant  
Geismar, Ascension Parish, Louisiana  
Agency Interest Number: 1468  
Activity Number: PER20080019  
Proposed Permit Number: 2391-V9**

**I. APPLICANT**

**Company:**

Rubicon, LLC - Geismar Plant  
PO Box 517  
Geismar, Louisiana 70734-0517

**Facility:**

Rubicon, LLC  
9156 Hwy 75  
Geismar, Ascension Parish, Louisiana  
Latitude 30 Deg 12 Min 05 Sec  
Longitude 91 Deg 0 Min 41 Sec

**II. FACILITY AND CURRENT PERMIT STATUS**

Rubicon, LLC is a chemical manufacturer of a variety of organic and inorganic chemicals at their Geismar Facility and has been in operation since 1966. The MDI plant consists of several activities that are operated to support the production of methylene diphenyl diisocyanate (MDI). Currently the facility operates under Permit No. 2391-V8, dated June 22, 2007.

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Rubicon, LLC - Geismar Plant is a designated Part 70 source. Several Part 70 permits have been issued to the operating units within the Geismar. These include:

Permit No.	Unit or Source	Date Issued
2261-V2	Aniline Complex	September 26, 2005
2391-V8	MDI Plant	June 22, 2007
2010-V0	Polyols Plant	April 18, 2005
2278-V0	Reduction Plant	October 28, 2002
2420-V1	Offsites Area	December 21, 2007
3037-V0	Maleic Anhydride Plant	March 21, 2007

### III. PROPOSED PROJECT/PERMIT INFORMATION

#### Application

A permit application dated July 8, 2008 was submitted requesting a Part 70 operating permit renewal/modification.

#### Proposed Permit

Rubicon requested a renewal/modification of the Part 70 Operating Permit No. 2391-V9 as required by Louisiana Administrative Code (LAC) 33:III.507.E.

A notice requesting public comment on the permit was published in *The Advocate*, Baton Rouge, and in *The Gonzales Weekly*, Gonzales. A copy of the notice was mailed to concerned citizens listed in the Office of Environmental Services Public Notice Mailing List. The application and proposed permit were submitted to the East Baton Rouge Parish Library. The proposed permit was also submitted to US EPA Region 6. All comments will be considered prior to the final permit decision.

#### Project Description

The MDI Plant includes the MDI 1, MDI 2, MDI 3, and Variants process units. Methylene diphenyl diisocyanate (MDI) is produced in the MDI 1, MDI 2, and MDI 3 process units. The product MDI is then processed into either pure MDI or combined with blend additives in the Variants process unit to make various MDI-based products.

Several processing activities are operated to support the production of MDI. These include the production of diaminodiphenyl methane (DADPM in 2 units) and its consequent reaction with phosgene to form MDI in the MDI 1, MDI 2, and MDI 3 units.

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The product MDI is then processed into either a pure product (pure MDI) or combined with blend additives to produce various MDI based products at the Variants unit. The following are brief descriptions of processes involved in producing MDI.

Phosgene Process

The phosgene ( $\text{COCl}_2$ ) manufacturing process uses chlorine and carbon monoxide (CO) as its raw material feeds. Excess CO and gaseous chlorine are fed through catalyst-filled tubes in an exchanger to produce phosgene. The phosgene which is produced is condensed for subsequent use in the MDI manufacturing process. Carbon tetrachloride, a coincidental reaction by-product, and other noncondensables are vented through the caustic scrubber in the MDI 1 plant, and through the caustic scrubbers to the North Waste Heat boiler (Emission Point IA, Permit No. 3037-V1) under normal operation in the MDI 2 and MDI 3 plants.

DADPM Batch Process

DADPM is a precursor to MDI. The DADPM process consists of reaction and neutralization steps that are followed by product washing and stripping of impurities from the product stream.

Aniline and hydrochloric acid (HCl) solution are mixed in reactors with aqueous formaldehyde to make DADPM. Residual HCl from the reaction is neutralized with sodium hydroxide (NaOH) solution to form an aqueous brine wastewater. The crude DADPM is then purified by washing and stripping to remove residual salt, NaOH, and dissolved aniline, which is recovered and recycled back into the process.

DADPM Continuous Process

The proposed Continuous DADPM Unit (CDU) will consist primarily of new reactors, isomerization towers, static mixers, and plate coolers. The CDU will be built in the existing DADPM-2 Plant.

A CDU Feed Drum is designed to stabilize flow through the train. In the Feed Drum, hydrogen chloride gas (HCl) reacts with aniline. Feeding HCl as an aqueous solution is also possible. The contents of the Feed Drum are pumped through a series of reactors and coolers. Formalin (a formaldehyde solution in water) is injected into the CDU reactor train at multiple points. Each injection point is followed by a reactor to provide sufficient time for the Formalin to completely react. Each reactor is preceded by a plate cooler to remove the heat of reaction. A static mixer is installed upstream and downstream of each formalin injection point. The last reactor discharges to Buffer Vessels.

The Buffer Vessels act as feed vessels for the Isomerization Towers and control the process temperature. The existing "E" and "F" DADPM reactors will function as the Buffer Vessels. Two (2) DADPM reactors are needed for startup and so a spare is

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available in case equipment maintenance or repair is needed. The Isomerization Towers provide residence time to complete DADPM isomerization.

The outlet of the Isomerization Towers is mixed with caustic to neutralize acid. The vapor from the Neutralizer is scrubbed to remove DADPM and salt. The Neutralizer contents are pumped to a separator to phase separate the organic and aqueous phases. The Neutralizer Separator phases will gravity drain and the output will continue to the Workup Section. An existing Amine Brine Receiver collects various Rework streams and pump them to the Neutralizer. A pump-through evaporator flashes off water in the Neutralizer to ensure proper operation of the Effluent Extractor.

#### MDI Process

DADPM and  $\text{COCl}_2$  are used with chlorobenzene (MCB) as a diluent to manufacture MDI. HCl is also generated as a by-product.

The reaction products enter a series of condensers where most of the MCB and unreacted  $\text{COCl}_2$  are condensed and returned to the process. Any uncondensed vapors are scrubbed with cold MCB in the phosgene absorber and are returned to the process. The HCl vapor exiting from the top of the phosgene absorber is absorbed in water to form an acid solution. The overhead stream from the HCl absorber is then directed to the caustic scrubber for final reaction and neutralization in the MDI 1 plant, and through the caustic scrubbers to the North Waste Heat boiler (Emission Point 1A, Permit No. 3037-V1) under normal operation in the MDI 2 and MDI 3 plants. The HCl solution by-product is cooled and stored prior to use elsewhere on Rubicon's site or for shipment for outside sales. Crude MDI is further purified by distillation to remove MCB and any remaining phosgene.

The Anhydrous HCl Export Section compresses anhydrous HCl from the MDI process units and transports the stream to offsite customers via pipeline.

#### MDI Pure and Variants

Rubicon's MDI Pure process separates the isomers of MDI to produce pure MDI product. The Variants process combines the MDI with blending additives to produce MDI based products.

In this renewal/modification, Rubicon requested the following changes:

1. The increase of the MDI 2 Cooling Tower flowrate from 13,600 gal/min to 25,000 gal/min (EQT0422).
2. The update of the equipment list.
3. The update of the effluent line cleaning calculations.
4. The update of the throughput for the following emission sources,
  - KK (EQT389)
  - KV (MF-4503C); (RLP036)
  - MC, (MF-4503I); (EQT404)
  - MG, (MS-4518, MS-4519); (RLP040)

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- MH-1; (EQT413)
  - MH-2; (EQT414)
  - MK; (EQT415)
  - MN; (EQT417)
  - MX; (EQT424)
5. The incorporation of the HCl operations currently permitted in the Maleic Anhydride Plant Part 70 Permit No. 3037-V1 issued on August 13, 2008.
  6. The addition of the Miscellaneous Organic NESHAP (MON) MACT applicability.
  7. The revision of the emission limits from the facility's remaining emission points sources based on updated emission factors and/or current facility conditions.

**Proposed Permit**

Permit 2391-V9 will be the renewal/modification Part 70 operating permit 2391-V8 for the MDI Plant.

**Permitted Air Emissions**

Estimated emissions in tons per year are as follows:

Pollutant	Before	After	Change
PM <sub>10</sub>	9.89	10.72	+0.83
SO <sub>2</sub>	—	—	—
NO <sub>x</sub>	—	—	—
CO	816.28	816.28	—
VOC*	188.05	190.39	+2.34

**\*VOC LAC 33:III.Chapter 51 Toxic Air Pollutants (TAPs), (TPY):**

Pollutants	Before	After	Change
4,4'-Methylenebisbenzeneamine	1.67	1.67	—
Aniline	4.25	4.25	—
Benzene	<0.001	<0.001	—
Carbon tetrachloride	26.07	26.07	—
Chlorobenzene	149.56	150.80	+1.24
Chloroform	0.53	0.53	—
Ethylene glycol	1.55	1.55	—
Formaldehyde	0.45	0.77	+0.32
Methanol	1.42	2.03	+0.61
Methylene diphenyl diisocyanate	2.54	2.53	-0.01
Phenol	<0.001	<0.001	—
Phosgene	0.03	0.20	+0.17
Total TAPs	188.07	190.40	+2.33

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#### **IV REGULATORY ANALYSIS**

The applicability of the appropriate regulations is straightforward and provided in the Specific Requirements section of the proposed permit. Similarly, the Monitoring, Reporting and Recordkeeping necessary to demonstrate compliance with the applicable terms, conditions and standards are also provided in the Specific Requirements section of the proposed permit.

##### **Applicability and Exemptions of Selected Subject Items**

See Tables X and XI of Air Briefing Sheet

##### **Prevention of Significant Deterioration/Nonattainment Review**

There are no net emission increases of PSD applicable compounds above the significance level. Therefore, this project is exempted from PSD review.

There are no emissions increases of NO<sub>x</sub>. Because the VOC increase due to Formalin tank temperature change is far below the significance level of 25 tons, this project is exempt from NNSR review.

##### **Streamlined Equipment Leak Monitoring Program**

Not applicable

##### **MACT Requirements**

These regulations define maximum achievable control technology (MACT) standards for stationary source categories of hazardous air pollutants (HAPs). These HAPs are listed in the Clean Air Act Amendments of 1990. The facility will comply with all applicable MACT requirements.

##### **Air Quality Analysis**

Emissions associated with the proposed facility were reviewed by the Air Quality Assessment Division to ensure compliance with the NAAQS and AAS. LDEQ did not require the applicant to model emissions.

Dispersion Model(s) Used: ISC3

Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Toxic Air Pollutant Ambient Air Standard or (National Ambient Air Quality Standard (NAAQS))
Ammonia	8 hour	612 ug/m <sup>3</sup>	640 ug/m <sup>3</sup>
Aniline	8 hour	19.9 ug/m <sup>3</sup>	181 ug/m <sup>3</sup>
Benzene	Annual	2.73 ug/m <sup>3</sup>	12 ug/m <sup>3</sup>
Carbon Tetrachloride	Annual	0.74 ug/m <sup>3</sup>	6.67 ug/m <sup>3</sup>

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Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Toxic Air Pollutant Ambient Air Standard or (National Ambient Air Quality Standard (NAAQS))
Chlorine	8 hour	1.3 ug/m <sup>3</sup>	35.7 ug/m <sup>3</sup>
Chlorobenzene	8 hour	85 ug/m <sup>3</sup>	1100 ug/m <sup>3</sup>
Chloroform	Annual	0.20 ug/m <sup>3</sup>	4.30 ug/m <sup>3</sup>
Formaldehyde	Annual	0.45 ug/m <sup>3</sup>	7.69 ug/m <sup>3</sup>
Hydrochloric Acid	8 hour	110 ug/m <sup>3</sup>	180 ug/m <sup>3</sup>
Methylene Chloride	Annual	12.9 ug/m <sup>3</sup>	212.77 ug/m <sup>3</sup>

**General Condition XVII Activities**

The facility will comply with the applicable General Condition XVII Activities emissions as required by the operating permit rule. However, General Condition XVII Activities are not subject to testing, monitoring, reporting or recordkeeping requirements. For a list of approved General Condition XVII Activities, refer to the Section VIII – General Condition XVII Activities of the proposed permit.

**Insignificant Activities**

All Insignificant Activities are authorized under LAC 33:III.501.B.5. For a list of approved Insignificant Activities, refer to Section IX – Insignificant Activities of the proposed permit.

**V. PERMIT SHIELD**

Not applicable

**VI. PERIODIC MONITORING**

All periodic monitoring is conducted in accordance with state and federal regulations. See Specific Requirement of the draft Part 70 permit renewal and modification for monitoring requirements.

**VII. GLOSSARY**

Carbon Monoxide (CO) – A colorless, odorless gas, which is an oxide of carbon.

Maximum Achievable Control Technology (MACT) – The maximum degree of reduction in emissions of each air pollutant subject to LAC 33:III.Chapter 51 (including a prohibition on such emissions, where achievable) that the administrative authority, upon review of submitted MACT compliance plans and other relevant information and taking into consideration the cost of achieving such emission reduction, as well as any non-air-quality health and environmental impacts and energy requirements, determines is achievable through application of measures, processes, methods, systems, or techniques.

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Hydrogen Sulfide ( $H_2S$ ) – A colorless inflammable gas having the characteristic odor of rotten eggs, and found in many mineral springs. It is produced by the reaction of acids on metallic sulfides, and is an important chemical reagent.

New Source Review (NSR) – A preconstruction review and permitting program applicable to new or modified major stationary sources of air pollutants regulated under the Clean Air Act (CAA). NSR is required by Parts C ("Prevention of Significant Deterioration of Air Quality") and D ("Nonattainment New Source Review").

Nitrogen Oxides ( $NO_x$ ) – Compounds whose molecules consist of nitrogen and oxygen.

Organic Compound – Any compound of carbon and another element. Examples: Methane ( $CH_4$ ), Ethane ( $C_2H_6$ ), Carbon Disulfide ( $CS_2$ )

Part 70 Operating Permit – Also referred to as a Title V permit, required for major sources as defined in 40 CFR 70 and LAC 33:III.507. Major sources include, but are not limited to, sources which have the potential to emit:  $\geq 10$  tons per year of any toxic air pollutant;  $\geq 25$  tons of total toxic air pollutants; and  $\geq 100$  tons per year of regulated pollutants (unless regulated solely under 112(r) of the Clean Air Act) (25 tons per year for sources in non-attainment parishes).

$PM_{10}$  – Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by the method in Title 40, Code of Federal Regulations, Part 50, Appendix J.

Potential to Emit (PTE) – The maximum capacity of a stationary source to emit any air pollutant under its physical and operational design.

Prevention of Significant Deterioration (PSD) – A New Source Review permitting program for major sources in geographic areas that meet the National Ambient Air Quality Standards (NAAQS) at 40 CFR Part 50. PSD requirements are designed to ensure that the air quality in attainment areas will not degrade.

Sulfur Dioxide ( $SO_2$ ) – An oxide of sulfur.

Sulfuric Acid ( $H_2SO_4$ ) – A highly corrosive, dense oily liquid. It is a regulated toxic air pollutant under LAC 33:III.Chapter 51.

Title V Permit – See Part 70 Operating Permit.

Volatile Organic Compound (VOC) – Any organic compound, which participates in atmospheric photochemical reactions; that is, any organic compound other than those,